CLAIMS

1. A hydrophilic, monolithic chromatographic column including, as a stationary phase, a polyfunctional polyacrylamide gel, said polyacrylamide gel formed by polymerization of a monomer mixture, said mixture comprising

acrylamide;

bisacrylamide;

a non-reactive filler compound for forming pores in the polyacrylamide gel;

a polymerizable charge ligand of the formula RX wherein X is a functional group capable of maintaining a charge and R is an olefin functional group capable of free radical propagated polymerization; and

a polymerizable cyano compound of the formula R'CN wherein CN is cyano and R' is an olefin functional group capable of free radical propagated polymerization.

2. The column of claim 1 wherein the charge ligand has a negative charge.

3. The column of claim 2 wherein the charge ligand is a sulfonic acid.

4. The column of claim 1 wherein the charge ligand has a positive charge.

5. The column of claim 4 wherein the charge ligand is a quaternary amine.

6. The column of claim 1 wherein the charge ligand is from about 5 mol% to about 40 mol% of the total monomer components of the mixture.

7. The column of claim 1 wherein the filler compound is polyethylene glycol.

8. The column of claim 7 wherein the polyethylene glycol has a molecular weight from about 7,500 to about 20,000.

9. The column of claim 1 wherein the filler compound is from about 1% (w/v) to about 5% (w/v) of the monomer mixture.

10. The column of claim 1 wherein the monomer R'CN forms about 30 mol% to about 40 mol% of the total monomer components of the mixture.

11. The column of claim 1 wherein R' of the monomer R'CN comprises an acrylate or a vinyl ether.

12. The column of claim 11 wherein the monomer R'CN of the monomer mixture is 2-cyanoethyl acrylate.

13. A method of chromatographically separating a mixture of saccharides comprising the steps of

introducing a saccharide mixture to the column of claim 1;

inducing flow of a mobile phase through the column to produce a column effluent; and

detecting separated saccharides in the column effluent.

14. The method of claim 13 wherein flow of the mobile phase is induced by applying an electric field to the column.

15. A method of chromatographically separating a mixture of saccharides comprising the steps of

introducing a saccharide mixture to a chromatographic column, wherein said column includes, as a stationary phase, a polyfunctional polyacrylamide gel, said polyacrylamide gel formed by polymerization of a monomer mixture, said mixture comprising acrylamide, bisacrylamide, a non-reactive filler compound for forming pores in the polyacrylamide gel, a polymerizable charge ligand of the formula RX wherein X is a functional group capable of maintaining a charge and R is an olefin functional group capable of free radical propagated polymerization and either a polymerizable cyano compound of the formula R'CN wherein CN is cyano and R' is an olefin functional group capable of free radical propagated polymerization or a polymerizable amine of the formula R"N(R_1)(R_2), wherein R_1 and R_2 are each independently either H or a C_1 to C_6 alkyl and R" is an olefin functional group capable of free radical propagated polymerization;

inducing flow of a mobile phase through the column to produce a column effluent; and

detecting separated saccharides in the column effluent.

16. The method of claim 15 wherein the saccharide mixture contains monosaccharides, disaccharides, oligosaccharides or mixtures thereof.

17. The method of claim 15 wherein the charge ligand has a negative charge.

18. The method of claim 15 wherein the charge ligand has a positive charge.

19. The method of claim 15 wherein the saccharide mixture comprises saccharide anomers and the mobile phase comprises from about 80 vol% to about 99 vol% of acetonitrile.

20. The method of claim 15 wherein the column effluent is analyzed by mass spectroscopy.

21. The method of claim 15 wherein the amine is a primary amine.

22. The method of claim 15 wherein the filler compound is polyethylene glycol.

23. The method of claim 22 wherein the polyethylene glycol has a molecular weight from about 7,500 to about 20,000.

24. The method of claim 15 wherein the filler compound is from about 1% (w/v) to about 5% (w/v) of the monomer mixture.

25. The method of claim 15 wherein the flow of the mobile phase is induced by applying an electric field to the column.

26. A method of chromatographically separating a mixture of saccharides comprising the steps of

introducing a saccharide mixture to a chromatographic column, wherein said column includes, as a stationary phase, a polyfunctional polyacrylamide gel, said polyacrylamide gel formed by polymerization of a monomer mixture, said mixture comprising acrylamide, bisacrylamide, a non-reactive filler compound for forming pores in the polyacrylamide gel, and either a polymerizable cyano compound of the formula R'CN wherein CN is cyano and R' is an olefin functional group capable of free radical propagated polymerization or a polymerizable amine of the formula R"N(R_1)(R_2), wherein R_1 and R_2 are each independently either H or a C_1 to C_6 alkyl and R" is an olefin functional group capable of free radical propagated polymerization;

inducing flow of a mobile phase through the column to produce a column effluent; and

detecting separated saccharides in the column effluent.

27. The method of claim 26 wherein the saccharide mixture contains monosaccharides, disaccharides, oligosaccharides or mixtures thereof.

28. The method of claim 26 wherein the monomer mixture further comprises a polymerizable charge ligand of the formula RX wherein X is a functional group capable of maintaining a charge and R is an olefin functional group capable of free radical propagated polymerization.

29. The method of claim 28 wherein the charge ligand has a negative charge.

30. The method of claim 28 wherein the charge ligand has a positive charge.

31. The method of claim 28 wherein the flow of the mobile phase is induced by applying an electric field to the column.

32. The method of claim 26 wherein the saccharide mixture comprises saccharide anomers and the mobile phase comprises from about 80 vol% to about 99 vol% of acetonitrile.

33. The method of claim 26 wherein the column effluent is analyzed by mass spectroscopy.

34. The method of claim 26 wherein the amine is a primary amine.

35. The method of claim 26 wherein the filler compound is polyethylene glycol.

36. The method of claim 35 wherein the polyethylene glycol has a molecular weight from about 7,500 to about 20,000.

37. The method of claim 26 wherein the filler compound is from about 1% (w/v) to about 5% (w/v) of the monomer mixture.